

# SEISMOTECTONIC AND NEOTECTONIC INVESTIGATIONS IN SOUTHERN BULGARIA

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The investigation is performed in the Gorno Thracian depression and the Tundjian lowering. The two structures are located on the northern and eastern margin of the Rhodopian (Macedonian) microplate and the both are results of postalpine formations. The Gorno Thracian depression is divided on 3 basic structures: Plovdiv lowering, Chirpan step and Zagora lowering. In the Tundjian lowering can be definite the 3 small blocks: Jambol, St. Ilija and Elhovo.

The neotectonic development of the Gorno Thracian depression is longer than those of the Tundjian lowering. The block disintegration and differentiation of the first structure is higher than those of the second structure.

The seismic events in the Gorno Thracian depression ( $M_{max}$  7.4) are numerous. The epicenters of the shocks are concentrated mainly in the region of the boundaries of the Chirpan step. The earthquakes in the Tundjian lowering ( $M_{max}$  5.9) are fewer. Many epicenters are located in the Jambol block. In many cases the epicenters of the earthquakes are concentrated nearby to the crossings of the lineaments and faults with N-S and NE-SW directions as well as with NW-SE and W-E directions.

In the Gorno Thracian depression and the Tundjian lowering are developed 4 seismogenic layers. The migration of the hypocenters of the shocks with  $M \geq 4$  within and among the seismogenic layers is studied in three profiles. The trends of the seismic migration are presented by vectors connecting the hypocenters in a order of their activation. The migration can be examined in respect of the following two aspects:

- interrelation of the vectors with the boundaries of the seismogenic layers;
- interrelation of the vectors with the earth surface.

In the respect of the first aspect in the area of the study the hypocentral migration is within and among the seismogenic layers. In the respect of the second aspect in the area of the study the hypocentral migration is within and among the seismogenic layers. In the respect of the second aspect the migration is horizontal, oblique and vertical. Many of the horizontal vectors of the migration within the seismogenic layers indicate the stratification of the upper part of the lithosphere. The vertical vectors of the migration among the seismogenic layers can be discussed as a mark for the seismic activity of the Olt and Zagora lineaments and the Tundjian fault.

In the area of study the strong shocks are in the first seismogenic layer.

The application of the knowledges about the depth of the lithosphere shows that the

most active territories of the two structures are situated above the slopes of a big regional raising of the astenosphere.

## COMPARISON OF THE SEISMOGENIC LAYERS IN REGIONS OF HIGH SEISMIC ACTIVITY IN BULGARIA AND ALGERIA

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The objects of the investigation are the following 3 regions of high seismic activity: Plovdiv-Chirpan (Bulgaria), Jambol (Bulgaria) and Chlef-Tenes (Algeria). The Plovdiv-Chirpan and Jambol regions are located in Southern Bulgaria. The regions are part of the Srednogorian tectonic structure, where postalpine, Paleogene and neogene-Quaternary grabens are widely presented. The Chlef-Tenes region is placed in the Western coastal part of Northern Algeria. The area of study is a part of the Magrebidies, where the post-alpine grabens with thick Neogene-Quaternary deposits are formed locally.

The regularities of the shock distribution permit the differentiation of seismogenic layers, 4 seismogenic layers are established in the regions of Plovdiv-Chirpan and Jambol regions and 3 seismogenic layers in Chlef region. The layers are situated in the following depths:

Plovdiv-Chirpan	-	5-17,	20-30,	35-35,	50-60 km;
Jambol	-	7-13,	16-22,	25-32,	35-42 km;
Chlef-Tenes	-	6-17,	20-30,	35-45 km.	

The results of the comparison of the seismogenic layers in the different regions are the following:

1. The levels of the seismogenic layers in the regions of Plovdiv-Chirpan and Chlef-Tenes are similar. In the Jambol region the levels are in narrower depth range and they are closer to the earth surface.

2. In the Chlef-Tenes region the big part of seismic manifestations are mainly in the first seismogenic layer. There are a few hypocenters in the second and third layers. In the other two regions the seismic activity of the all layers is significant.

3. Within the boundaries of the seismogenic layers, some depth ranges with concentrations of hypocenters of the shocks can be examined:

Plovdiv-Chirpan	-	5-6,	10-12,	15-17,	20,	24-25,	30,	40 km;
Jambol	-	10-12,	19-21,	30 km;				
Chlef-Tenes	-	7-8,	10-11,	20 km.				

The depth ranges of hypocenter concentrations are situated on the boundaries or in the middle parts of the seismogenic layers.